

WEST Search History

DATE: Monday, May 03, 2004

Hide?	<u>Set Name</u>	<u>Query</u>	<u>Hit Count</u>
	<i>DB=USPT,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR</i>		
<input type="checkbox"/>	L22	(power near3 start\$4) same status same (application near2 program)	1
<input type="checkbox"/>	L21	l8 and L17	3
<input type="checkbox"/>	L20	l2.ab. and L17	1
<input type="checkbox"/>	L19	l2 and L17	17
<input type="checkbox"/>	L18	l1 and L17	21
<input type="checkbox"/>	L17	l12 or l13 or l14 or l15 or l16	1644
<input type="checkbox"/>	L16	710/67.ccls.	93
<input type="checkbox"/>	L15	710/65.ccls.	292
<input type="checkbox"/>	L14	713/330.ccls.	213
<input type="checkbox"/>	L13	713/320.ccls.	519
<input type="checkbox"/>	L12	713/300.ccls.	816
<input type="checkbox"/>	L11	L8 same (automatic\$4 or dynamic\$4)	4
<input type="checkbox"/>	L10	L8 same (execut\$4 near3 program\$4)	1
<input type="checkbox"/>	L9	L8.ab.	23
<input type="checkbox"/>	L8	((instruct\$4 or command\$4) near5 (power near2 (supply or source)) near3 (on or activat\$4))	134
<input type="checkbox"/>	L7	(key near3 depress\$4) same (power near3 source near3 (on or activat\$4))	4
<input type="checkbox"/>	L6	power same key same ((automatic\$7 or dynamic\$7) near3 program near3 execut\$4)	5
<input type="checkbox"/>	L5	L4 same power	0
<input type="checkbox"/>	L4	(depress\$7 near3 key) same ((automatic\$7 or dynamic\$7) near3 program near3 execut\$4)	17
<input type="checkbox"/>	L3	L2 same (program near3 execut\$4)	5
<input type="checkbox"/>	L2	(predetermined near2 key) with power	202
<input type="checkbox"/>	L1	(predetermined near2 key) same power	382

END OF SEARCH HISTORY

First Hit Fwd Refs

Generate Collection

Print

L21: Entry 2 of 3

File: USPT

Jan 5, 1999

DOCUMENT-IDENTIFIER: US 5856789 A

TITLE: Power supply switching of a computer system by a remote controller

Abstract Text (1):

A method and apparatus for switching the power supply of a computer system by a remote controller are provided. A configuration step is performed first which assigns a selected button on a remote controller to a wake-up operation of the computer system. At the end of the configuration step, a code representative of the selected button being activated is stored into a register within the computer system. If the selected button is found to be activated, the method and apparatus instruct the power supply system to turn on the main power supply.

Current US Original Classification (1):

713/300

CLAIMS:

1. A method for waking up a computer system by a button of a remote controller, the computer system including a wireless signal receiver and a power supply system selectively generating a main power supply and a standby power supply, the button, when activated, generating a data code at f1 frequency, the remote controller transmitting the data code out wirelessly via a carrier signal of f2 frequency, f2 being larger than f1, the method comprising the steps of:

(1) assigning the button to be a wake-up operation of the computer systems, said step of assigning comes the steps of:

(11) specifying the wake-up operation,

(12) instructing the computer system to sample data at f3 frequency wherein f3 is larger than f2,

(13) the computer system obtaining a code corresponding to the button while the button is activated, and

(14) storing the code into a register in the computer system, wherein the register is powered by a battery power supply when the power supply system is totally shut down;

(2) determining if the button is activated: and

(3) if the button is activated in step (2), instructing the power supply system to turn on the main power supply to power the computer system.

3. A computer system including a wireless remote receiver adapted to communicate with a remote controller, the computer including a power supply system selectively generating a main power supply and a standby power supply, each button of the remote controller, when activated, generating a data code at f1 frequency, the remote controller transmitting the data code out wirelessly via a carrier signal of f2 frequency, f2 being larger than f1, the computer system comprising:

a central processor unit;

a memory coupled to the central processor unit, the memory storing a procedure when assigns one selected button on the remote controller to be a wake-up operation of the computer system by sampling data at $f3$ frequency such that a code corresponding to the selected button is obtained while the selected button is activated, wherein $f3$ is larger than $f2$, and storing the code into a register within the controller; and

a controller, responsive to activation of the selected button, for instructing the power supply system to turn on the main power supply to power the computer system.

5. A method for waking up a computer system by a button of a remote controller, the computer system including a wireless signal receiver and a power supply system selectively generating a main power supply and a standby power supply, the remote controller generating a data code corresponding to the activated button at $f1$ frequency wirelessly, the method comprising the steps of:

(1) assigning the button to be a wake-up operation of the computer system, said step of assigning comprises the steps of:

(11) specifying the wake-up operation,

(12) instructing the computer system to sample data at $f2$ frequency, wherein $f2$ is larger than $f1$,

(13) the computer system obtaining a code corresponding to the button while the button is activated, and

(14) storing the code into a register within the computer system;

(2) determining if the button is activated; and

(3) if the button is activated in step (2), instructing the power supply system to turn on the main power supply to power the computer system.

7. A computer system including a wireless remote receiver adapted to communicate with a remote controller, the computer system including a power supply system selectively generating a main power supply and a standby power supply, the remote controller generating a data code at $f1$ frequency wirelessly when one button of the remote controller is activated, the computer system comprising:

a central processor unit;

a memory coupled to the central processor unit, the memory storing a procedure when assigns one selected button on the remote controller to be a wake-up operation of the computer system by sampling data at $f2$ frequency such that a code corresponding to the selected button is obtained while the selected button is activated, wherein $f2$ is larger than $f1$, and storing the code into a register within the computer system; and

a controller, responsive to activation of the selected button, for instructing the power supply system to turn on the main power supply to power the computer system.

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End of Result Set



Generate Collection

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L20: Entry 1 of 1

File: USPT

Sep 23, 2003

DOCUMENT-IDENTIFIER: US 6625738 B1

**** See image for Certificate of Correction ****

TITLE: USB apparatus that turns on computer power supply using signals substantially longer than information conveying pulse widths when predetermined operation is performed on input device

Abstract Text (1):

An apparatus for turning on a computer power supply in which when an input operation of a predetermined key is carried out, predetermined H signals are output to a first signal line and a second signal line of a USB chip provided in a keyboard. Since this signal combination is not a USB standard signal combination, they can be distinguished from ordinary data signals. Since a wake-up device which has received these signals outputs predetermined start-up signals to a main power supply, the main power supply can be turned on. When the main power supply is turned on, connections of a first relay contact and a second relay contact of a switching device switch are switched, whereby first signal lines and second signals between the host computer and a keyboard are connected together, making it possible to carry out communication using the signals. By virtue of this structure, it is possible to start up the host computer whose main power supply is in an off state by operating the keyboard.

Current US Cross Reference Classification (1):710/67

[First Hit](#) [Fwd Refs](#)

End of Result Set



Generate Collection

Print

L10: Entry 1 of 1

File: USPT

Oct 28, 1997

DOCUMENT-IDENTIFIER: US 5682272 A

**** See image for Certificate of Correction ****

TITLE: Disk drive and method for retrying a read operation upon detecting a read error

Detailed Description Text (62):

The counter for counting the number of times of retrieval RC, the counter for counting the number of times of dummy write operation DC, the threshold of the number of times of retrieval Nr, the number of times of starting the dummy write operation Nd, the threshold of the number of times of executing the dummy write operation Ne, and data of programs executed by the MPU 37 that are to be stored in the memory unit 38, are stored in the magnetic disk drive 14 shown in FIG. 3, and are read out by the service adapter (SA) from the magnetic disk drive 14 in response to the instruction from the resource manager 10, when the power supply is activated, and are loaded into the memory unit 38 in the device adapter (DA) 12.

First Hit Fwd Refs

Generate Collection

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L11: Entry 1 of 4

File: USPT

Jan 20, 2004

DOCUMENT-IDENTIFIER: US 6680878 B1

TITLE: Signal recording/reproducing apparatus

Brief Summary Text (28):

Further, as a third method, both of the battery and the power source circuit are provided with two kinds of operation modes for a heavy load and a light load, and a time measuring instrument and a storage unit for storing therein the time information are provided, and also there is provided means for setting clearly in the storage unit the data relating to a time zone (first time zone) in which the possibility that a user uses the apparatus is low and the data relating to a time zone (second time zone) in which the possibility that a user uses the apparatus is high, or for setting automatically such data in the storage unit. In the time zone in which the possibility that a user uses the apparatus is low in the standby state, the operation of the power source circuit is stopped to drive the system control unit and the peripheral circuits thereof by the battery. On the other hand, in the time zone in which the possibility that a user uses the apparatus is high in the standby state, the power source circuit is driven in the operation mode for the light load so as to drive the circuit blocks which are required to be operated even in the standby state. In addition, when an operation instruction is issued from a user, the power source circuit is activated in the operation mode for the heavy load. In such a way, the electric power is supplied to each of the circuit blocks in accordance with the operation state.

First Hit Fwd Refs

Generate Collection

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L11: Entry 2 of 4

File: USPT

Mar 16, 1993

DOCUMENT-IDENTIFIER: US 5194954 A

**** See image for Certificate of Correction ****

TITLE: Automatic channel sampling picture-in-picture circuitry

Detailed Description Text (17):

The present invention concerns automatic initiation of the channel sampling mode of operation. Referring to FIG. 2, in response to the detection of a power-on command (step 210) the operating power supply is activated, which in turn activates the receiver. In response to the detection of the "operating power supply ready" signal (230), controller 110 simulates the reception of a multi-channel start command (step 240), and proceeds to the section of the program code illustrated in FIG. 4, for controlling the channel sampling mode of operation. The section of the program illustrated in FIG. 2 is not reentered unless and until the television receiver is turned off. Description of the program steps of FIG. 4 is identical whether the multi-channel start command (MULTI) is simulated in response to the turning on of the receiver, or whether the command is actually generated by a user.

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Generate Collection

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L7: Entry 2 of 4

File: USPT

Mar 16, 1993

DOCUMENT-IDENTIFIER: US 5194968 A

**** See image for Certificate of Correction ****

TITLE: Communication apparatus

Detailed Description Text (6):

An operation of the first embodiment will be described below with reference to a flow chart shown in FIG. 5. When oscillation of the power source is started to activate the CPU of the communication apparatus, the signal PHLD from the OUT port 17 is fixed at a low level to continue oscillation of the power source in step S01. In step S02, the CPU checks in accordance with a signal from the 16-Hz detector circuit 15 whether the signal CI (16 Hz) is sent. If the signal CI is detected in step S02, the flow advances to an automatic receive operation in step S03. If the signal CI is not sent, a 10-sec timer is started in step S04, and the PCU checks in step S05 whether a start key (not shown) is depressed. If the start key is depressed, the flow advances to a send or receive operation in accordance with the presence/absence of an original sheet. If the start key is not depressed, depression of a copy key (not shown) is checked in step S07. If the copy key is depressed, the flow advances to a copy or feed operation in accordance with the presence/absence of an original sheet in step S08. If the copy key is not depressed, time over of ten seconds is checked in step S09. If time over is not determined, the flow returns to step S05. If time over is determined, the signal PHLD from the OUT port 17 is set at a high level in step S10. As a result, oscillation of the oscillation circuit 51 of the power source is stopped, and power supply to the communication apparatus is stopped accordingly. Note that after the operation is completed in step S03, S06, or S08, the signal PHLD is set at a high level in step S10, and the power source is disabled.

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Generate Collection

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L7: Entry 3 of 4

File: USPT

Mar 31, 1987

DOCUMENT-IDENTIFIER: US 4654818 A

TITLE: Data processing device having memory selectively interfacing with computer

Detailed Description Text (11):

One application of the system 10 is in an educational environment wherein a plurality of educational devices 20 are supplied to a number of users or "students". Each of the students gains access to the ROM resident program 42 by turning the device on and connecting the power source 54 to activate the CPU 48, the ROM 42 and the RAM 44. Once the power is turned on, the program in the ROM 42 is initiated and the CPU 48 can control the display 26 to prompt the student to depress a sequence of keys on the keypad 24. Depending upon the type of program in the ROM 42, the sequence of keys depressed by the student generates data that is stored in the RAM 44. This data can be the answer to particular questions stored in the ROM 42 as a predefined "quiz".

First Hit Fwd Refs

Generate Collection

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L3: Entry 1 of 5

File: USPT

Apr 1, 2003

DOCUMENT-IDENTIFIER: US 6543008 B1

TITLE: Computer system and program rewriting method

Brief Summary Text (10):

According to the present invention, there is provided a computer system comprising an EEPROM including a first memory region which stores a power supply control program for executing the power supply control of the computer system, and a second memory region which stores a power turn-on program for executing the turn-on of power in the system, a key input detection program for detecting a predetermined key input, and a rewrite request program for requesting the system for rewriting the contents of the first memory region; a key input detector for executing the key input detection program when the power supply in the system is turned on or reset; a power supply controller for effecting the power supply control of the system based on the power supply control program and the power turn-on program when a predetermined key input is not detected by the key input detector; and a rewrite circuit for rewriting the contents of the first memory region based on the rewrite request program when the predetermined key input is detected by the key input detector.

Brief Summary Text (11):

In the computer system according to the present invention, the second memory region is not an object to be rewritten, so that the minimum of programs necessary for the rewrite of the EEPROM and stored in the second memory region, such as the power turn-on program for executing the turn-on of power in the system, the key input detection program for detecting whether or not a predetermined key input is present, and a rewrite request program for requesting the system for rewriting the contents of the first memory region, operate without fail. Even in case the power supply control program stored in the first memory region does not correctly operate, it is possible to start the rewrite program. Further, the minimum of programs necessary for the rewrite of the EEPROM can be prevented from being damaged in case, during the rewrite processing, some abnormality or other has taken place.

Brief Summary Text (12):

In the computer system according to the present invention, the key input detection program is first executed in response to the turn-on or reset of power in the system. As a result of the execution of this key input detection program, the absence or presence of a predetermined key input indicating the rewrite of the contents of the first memory region is detected, and, in case no predetermined key input is present, the power supply control program and the power turn-on program are executed, so that the control of power supply in the system is effected. On the other hand, in case a predetermined key input is present, the rewrite request program is executed, whereby the rewrite of the contents of the first memory region is requested to the system.

Brief Summary Text (13):

In this way, by inputting a predetermined key, the rewrite program is forced to be executed, so that, even in the state in which the contents of the first memory region are destroyed and, thus, the control of power supply in the system cannot be correctly carried out or even in the state in which the version-up of the contents

of the above-mentioned contents must be made, it becomes possible to execute, on the board, the rewrite of the contents of the first memory region mentioned above.

Detailed Description Text (38):

Further, upon completion of the processing of rewrite into the EEPROM 161, the power supply control microcomputer 16 generates a reset by utilizing a watch dog timer function which it possesses itself (step B16). Due to the generation of the reset, the processing explained by the flow chart shown in FIG. 7 is restarted with the contents after rewrite. That is, if the result of the check-sum exhibits truth, and a predetermined key manipulation requesting a rewrite is not performed, then the power supply control program is started to execute a normal power supply control.

Detailed Description Text (43):

Further, the rewrite program can be compulsorily executed by inputting a predetermined key, so that, even under such circumstances that the contents of the EEPROM are destroyed and, thus, the power supply control in the system cannot be correctly carried out or that the contents thereof must be put to version-up, the rewrite of the contents thereof can be executed on the board.

http://westbrs:9000/bin/cgi-bin/accum_query.pl?MODE=%20%20%20%20Display%20%20%20... 5/3/04

First Hit Fwd Refs

Generate Collection

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L3: Entry 3 of 5

File: USPT

May 28, 1996

DOCUMENT-IDENTIFIER: US 5522076 A

TITLE: Computer system having BIOS (basic input/output system)-ROM (Read Only Memory) writing function

Abstract Text (1):

A flash memory used as a BIOS-ROM has a main block storing a BIOS and a boot block storing minimum programs executed in initializing the system. Upon a power-on operation, when a rewriting unit is connected to an expansion bus connector, a new boot block stored in a ROM of the rewriting unit is written in the flash memory. Upon the power-on operation, a key depression detecting routine in the boot block is executed to check whether a predetermined key is depressed. If the predetermined key is determined to be depressed, a rewriting program in a floppy disk is loaded in the system and executed, thereby rewriting the content of the main block into the BIOS file stored in the floppy disk.

Brief Summary Text (20):

In order to achieve the second and third objects, according to the second aspect of the present invention, there is provided a computer system comprising: a keyboard, having a plurality of keys, for receiving various instructions; a main memory arranged in a computer system main body; a first memory having a first memory area for storing a boot program for bootstrapping the computer system and various basic input/output programs for controlling hardware, and a second memory area for storing a key depression detecting program for detecting depression of a predetermined key of the keyboard and a load program for loading a program for rewriting the first memory area; a second memory storing a rewriting program for rewriting a content of the first memory area and capable of being inserted into the computer system main body; key depression detecting means for executing the key depression detecting program in the second memory area upon a power-on operation of the computer system to detect depression of the predetermined key of the keyboard; boot means for executing the boot program in the first memory area when the key depression detecting means does not detect the depression of the predetermined key; load means for executing the load program in the second memory area to load the rewriting program from the second memory to the main memory when the key depression detecting means detects the depression of the predetermined key; and rewriting means for executing the rewriting program loaded in the main memory to rewrite the content of the first memory area.

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L3: Entry 4 of 5

File: USPT

Apr 16, 1996

DOCUMENT-IDENTIFIER: US 5509107 A

TITLE: Character printer

Brief Summary Text (11):

In order to achieve the first objective, the character printer based on this invention comprises a plurality of function keys, display means for displaying the state of the printer and the printer setup condition, test program execution means for running test programs of test modes provided individually for a plurality of operational functions of the printer, test mode display means for displaying the test modes on the display means in response to the operation of a first predetermined function key among the multiple function keys at the power-on operation, test mode selection means for selecting one of the test modes in response to the operation of a second predetermined function key, and control means for operating on the test program execution means to run the test program of the test mode selected by the test mode selection means.

Brief Summary Text (13):

According to the above-mentioned arrangement of the inventive character printer, the test mode display means displays the multiple test modes on the display means when the operator operates the first predetermined function key among multiple function keys at the power-on operation. In response to the operation of the second predetermined function key, the test mode selection means selects one of the multiple test modes and the control means operates on the test program execution means to run the test program of the selected test mode. For certain test modes, the test program execution means runs the test program of the test mode selected by the test mode selection means only after the operator operates the predetermined function keys in the prescribed sequence.

First Hit**End of Result Set**

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L3: Entry 5 of 5

File: JPAB

Aug 22, 2003

DOCUMENT-IDENTIFIER: JP 2003233506 A

TITLE: COMPUTER SYSTEM AND TEST AND DIAGNOSTIC METHOD FOR THE SAME

Abstract Text (2):

SOLUTION: A ROM 14 stores a boot program and a basic test/diagnostic program. In response to turning on of a power source, the boot program is started, and a control part 15 detects that a predetermined key for instructing execution of the test/diagnostic program is pressed or not. If it is determined that the predetermined key is pressed, the test/diagnostic program designated to be executed is determined. The determination result is not the basic test/ diagnostic program, a new test/diagnostic program matching a change, addition, or the like of the system specifications is loaded from an external device 20 to be stored in an internal memory inside the control part 15. The control part 15 executes the basic test/diagnostic program or the new test/diagnostic program according to the result determining the execution instruction. If it is determined that the predetermined key is not pressed, an ordinary basic OS is started.

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L6: Entry 1 of 5

File: USPT

Jan 6, 2004

DOCUMENT-IDENTIFIER: US 6675300 B1

TITLE: Remote controlled computer system and management method having an identification number

Brief Summary Text (17):

A remote controller for use in the present invention includes: a first memory storing an identification number; a first command key for inputting a command to automatically execute an operating system; a second command key for inputting a command to automatically execute a first program after automatic log on of the operating system; a third command key for inputting a command to automatically execute a second program after automatic log on of the operating system; a first microcontroller generating a remote control signal, including a command code, corresponding to a selected one of the first to third command keys; a remote control signal transmission circuit using one of an infrared signal and a radio frequency (RF) signal in order to transmit the remote control signal to the remote control signal receiver of the computer system; and a power supply for supplying operational power for the remote controller.

Brief Summary Text (26):

In the present invention, the remote control signal includes: a first command generated by a first command key of the remote controller in order to perform an automatic log on of an operating system; a second command generated by a second command key of the remote controller in order to perform the automatic log on thereof and automatically execute a first program; and a third command generated by a third command key of the remote controller in order to perform the automatic log on thereof and automatically execute a second program. At this time, the method for remote control of the computer system in response to a remote control signal from a remote controller is performed according to the power state of the computer system, and does not include a power turn-off function in order to prevent data loss caused by shutdown of the operation when the remote controller mistakenly inputs information.

Detailed Description Text (23):

FIG. 11 illustrates transition of a power state of a computer system 200 according to a remote control signal. Referring now to FIG. 11, a power state of a computer system 200 is one of a normal state, a stand-by state, and an off state. The control by the remote controller 300, 300' is dependent upon the power state thereof. For example, if the windows selection key WIN, WIN' is selected when the computer system 200 lies in the off state, the computer system 200 is booted and the automatic log on of the windows is carried out. In that case, the power state of the computer system 200 is changed from the off state to the normal state (refer to arrow C1). If the first program selection key PG1, PG1' is selected, the computer system 200 is booted and the automatic log on of the windows is carried out, thereafter executing an assigned first program. Similarly, if the second program selection key PG2, PG2' is selected, the computer system 200 is booted and the automatic log on of the windows is carried out, thereafter executing an assigned second program. In these cases, the power states of the computer system 200 are changed from the off state to the normal state (refer to arrow C1) in the same manner as when the windows selection key WIN, WIN' is selected. In addition, if the window selection key WIN, WIN' is selected when the computer system 200 is

in the normal state, the computer system 200 is converted into the stand-by state (refer to arrow C2). If the first program selection key PG1, PG1' is selected, the first program is automatically executed, and the power state of the computer system 200 is kept in the normal state (refer to arrow C4). If the second program selection key PG2, PG2' is selected, the second program is automatically executed, and the power state of the computer system 200 is kept in the normal state (refer to arrow C4). Moreover, if the windows selection key WIN, WIN' is selected when the computer system 200 lies in the stand-by state, the state of the computer system 200 is converted to the normal state (refer to arrow C3). If the first or the second program selection key PG1, PG1' or PG2, PG2' are selected, no operation is carried out. In order to prevent data loss caused by shutdown of the operation when the remote controller mistakenly inputs information, particularly, the computer system and methods of the present invention desirably do not have a turn-off function. The remote control operational steps of the computer system 2000 using such a remote controller 300, 300' will now be described in detail.

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Generate Collection

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L6: Entry 2 of 5

File: USPT

Jan 17, 1995

DOCUMENT-IDENTIFIER: US 5382105 A

TITLE: Printer with automatic cutter

Brief Summary Text (10):

In the present invention, to achieve the above object, an automatic cutter test program-activating program and an automatic cutter test program, which are selectively executed in accordance with the condition of keys when a printer power source is turned on, are provided in a printer initializing program. With this arrangement, the test of the automatic cutter is conducted using only the printer.

First Hit Fwd Refs

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Jan 7, 1992

** See image for Certificate of Correction **

TITLE: Method and apparatus for preventing tool collision

Detailed Description Text (4) :

Denoted in FIG. 1 at 10 is a processor for effecting numerical control by executing programs, 11 is a programmable controller for programmed execution of operation of an electric power circuit which carries out sequence control of a four-axis lathe, and 12 is a program memory storing various control programs to be executed by the processor 10. The memory 12 also stores an automatic collision prevention program for automatically altering machining programs according to the present invention. A data memory 13 stores data required for executing the programs for the processor 10 such as machining programs composed of data formats of numerical control commands. A working memory 14 serves to temporarily store the results of arithmetic operations effected by the processor 10. A paper tape puncher 15 records data on a paper tape by punching the same. A paper tape reader 16 reads numerical control commands (NC commands) punched in an NC tape. A pulse distributor 17 effects an arithmetic operation to distribute pulses according to a motion command from the processor 10 and issues distributed pulses commensurate with the commanded amount. Denoted at 18x1, 18z1, 18x2, and 18z2 are servo circuits for driving tool rests TP1 and TP2 in the directions of X- and Z-axes by controlling the X1 and Z1 axes and X2 and Z2 axes of a four-axis lathe 19. A parameter memory 20 stores system parameters required for executing the automatic collision prevention program. A display controller 21 has input keys for setting the system parameters and the like. A display unit 22 serves to display the paths of movement of the tool rests on an animated screen as shown in FIG. 3(b). An address data bus (hereinafter referred to as a "bus") 23 allows data to be transmitted between the processor 10 and the memories 12, 13, 14 and 20, and an input/output device.